



Do Parents and Physicians Differ in Making Decisions About Acute Otitis Media?

PAUL CLAY SORUM, MD, PHD; JUNSEOP SHIM, MPA; GÉRARD CHASSEIGNE, PHD; ETIENNE MULLET, PHD; MARÍA TERESA MUÑOZ SASTRE, PHD; THOMAS STEWART, PHD; AND CLAUDIA GONZÁLEZ-VALLEJO, PHD

Albany, New York; Tours, Bruxelles, and Toulouse, France; and Athens, Ohio

■ **OBJECTIVES** We wanted to discover how parents differ from physicians in making decisions about how to treat a child who may have acute otitis media (AOM).

■ **STUDY DESIGN** We used questionnaires that required participants to judge the probability of AOM or choose treatment for 2 sets of 46 paper scenarios of hypothetical children aged 15 months who might have AOM, and they subsequently rated the importance of individual cues and described their attitudes and opinions related to health care and AOM.

■ **POPULATION** Convenience samples of 19 US family physicians, 35 French generalists, 21 French pediatricians, 52 US parents, and 86 French parents were included.

■ **OUTCOMES MEASURED** The primary outcomes were the judgment policies—the weights placed on each of the scenario cues when making decisions—that were derived for each individual and each group by multiple linear regression.

■ **RESULTS** The mean judged probabilities of AOM were nearly the same for all groups: 50% for the US physicians, 51% for the US parents, 52.5% for the French physicians, and 52% for the French parents. The percentages of cases treated with antibiotics did not differ: 53% for US physicians, 45% for US parents, 53% for French physicians, and 51% for French parents. All groups gave greatest weight to the physical examination cues for decisions about both diagnosis and treatment. The parents paid little attention to the cues that reflected parental concerns.

■ **CONCLUSIONS** US and French parents were very similar to physicians in their judgments and treatment choices regarding AOM. They appear to be able to adopt the physician's point of view and to be selective in the use of antibiotics.

■ **KEY WORDS** Parents [non-MESH]; decision making; acute otitis media [non-MESH]; antibiotics; France. (*J Fam Pract* 2002; 51:51-57)

KEY POINTS FOR CLINICIANS

- The appearance of the eardrum was the key factor in decision making about acute otitis media.
- Both physicians and parents paid little attention to parental-sensitive factors when choosing treatment.
- Parents were able to adopt the physician's point of view.
- Parents in the United States and France may be more willing to forgo antibiotics than physicians realize.

Acute otitis media (AOM) is the most frequent diagnosis for which antibiotics are prescribed in the United States^{1,2} and is among the most frequent in France.³ The benefit of antibiotic treatment is under scrutiny as physicians, parents, and policymakers in the United States,^{4,7} France,^{3,8-13} and elsewhere¹⁴⁻¹⁶ become increasingly worried about bacterial resistance to antibiotics.

Patients and caregivers often have a firm idea of what is wrong with their child and how it should be treated.^{17,18} Conflict with the physician may partially result from different interpretations that parents and physicians give to the same cues from the child's history and physical examination, and the different implications derived from them. Despite evidence to the contrary,¹⁹⁻²² studies in the United States and Britain show that physicians feel parents are becoming increasingly demanding: They expect them to pre-

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From the departments of Medicine and Pediatrics, Albany Medical Center, Albany (P.C.S.); the Center for Policy Research, State University of New York-Albany (J.S., T.S.); the Département de Psychologie, Université François-Rabelais, Tours (G.C.); Ecole Pratique des Hautes Etudes (E.M.); the Département de Psychologie Clinique et Pathologique, Université du Mirail, Toulouse (M.T.M.S.); and the Department of Psychology, Ohio University, Athens (C.G.). Reprint requests should be addressed to Paul Clay Sorum, MD, Albany Med Primary Care Network, 724 Watervliet-Shaker Road, Latham, NY 12110. E-mail: sorump@mail.amc.edu.

scribe antibiotics even when they are not indicated and will be dissatisfied if they are not prescribed.²²⁻²⁹

The purpose of our study was to elucidate the differences between physicians and parents both in the United States and France by comparing their diagnostic judgments and treatment choices when dealing with children who might be suffering from AOM.

METHODS

This study was primarily a "judgment analysis."³⁰ In judgment analyses, individuals make a series of judgments (eg, diagnoses or treatment choices about a series of patients) according to a set of varying cues (eg, signs and symptoms). Using multiple linear regression analyses, it is possible to determine how much weight they put on each cue when making their decisions. Separate regression analyses are performed for each person, with the cues as the predictors and the judgment (diagnoses or treatment decisions) as the variable predicted. The beta weights from the regression, suitably adjusted for differences in units of measurement, are estimates of the relative importance of the cues in making judgments. A higher beta weight for a cue indicates that it carried greater weight in making the diagnosis or treatment decision. Between- and within-group comparisons of these weights may reveal why people differ in their judgments of identical cases.

Participants

The samples consisted of 19 US family physicians, 35 French general practitioners, 21 French pediatricians, 52 US parents, and 86 French parents. The US physicians were recruited from the 62 family physicians in the region of Albany and Schenectady, New York, through written and oral appeals from the study team. The French practitioners consisted of personal contacts and members of 2 networks of research-minded general practitioners. The French pediatricians were recruited by written appeals to the 30 practicing pediatricians in and around Tours, France. The US parents were responders to a recruitment letter sent to 100 randomly selected parents of young children of one primary care practice in suburban Albany. The French parents were recruited by students at the Université François-Rabelais in Tours.³¹

Procedure

We constructed 46 paper scenarios describing hypo-

TABLE 1 DIFFERENCES AMONG GROUPS OF PARTICIPANTS

	US Physicians (n=19)	US Parents (n=52)	French Physicians (n=56)	French Parents (n=86)
Mean judged probability of AOM (range)	50 (28 to 75)	51 (29 to 78)	52.5 (33 to 85)	52 (30 to 73)
Mean judged probability of treatment (range)	0.22 (-2.4 to 3.0)	-0.32 (-2.7 to 3.1)	0.36 (-1.5 to 3.0)	-0.42 (-2.9 to 2.6)

NOTE: The treatment score is the combination of the choice of observation versus antibiotics and the degree of certainty that this is the right choice, ranging from -5 (observe/completely sure) to 5 (antibiotics/completely sure). AOM denotes acute otitis media.

thetical children aged 15 months who might have ear infections. Each scenario displayed the values for 15 different cues, such as fever, redness of the tympanic membrane, or ear pain during examination (see the figure at www.jfponline.com for more information). These cues were selected after consultation with physicians and parents, who felt that they were important for decisions about the diagnosis and treatment of AOM. The diagnostic cues were based on our previous study of US pediatricians³² and on the medical literature in the United States,³³⁻³⁵ France,^{36,37} and elsewhere.^{14,38} We included the result of insufflation of the tympanic membrane, even though French primary care physicians are not taught to use pneumatic insufflation in their diagnosis of AOM.

The cue values for each case were generated randomly using a computer program. Very implausible combinations of cue values were excluded from the scenarios. We did not, however, attempt to create a set of cases that would reproduce the actual mix of cases seen by pediatricians in their offices. Indeed, the inclusion of unlikely combinations of cue values was useful in forcing the participants to choose which cues were most important. Intercorrelation between cues was small to moderate, ranging from -0.40 to 0.39. This resulted from the rules for excluding implausible cases (eg, 0.39 between bulging and mobility) or from chance (eg, -0.40 between a history of ear pain and ear pain during the examination). The participants were told to put themselves in the place of the examining physician. They were presented twice with the same 46 scenarios. For one set they were asked to judge the probability that each child had AOM. For the other, in which the cases were presented in a different order, they were to decide whether to treat with antibiotics or to observe the child. They were also asked in the second set to indicate on a 5-point scale their degree of certainty that this was the right

TABLE 2

MEAN BETA WEIGHTS FOR CUES FOR JUDGING PROBABILITY OF ACUTE OTITIS MEDIA				
Cue	US Physicians (n=19)	US Parents (n=52)	French Physicians (n=55)	French Parents (n=81)
History				
Past history of AOM	0.02	0.08	0.03†	0.15
URI symptoms	0.07	-0.01	0	0.03
Ear pain noted by parent	0.09	0.07	0.04	0.04
Findings on Examination				
Fever	0.20	0.21	0.16†	0.30†
Redness of tympanic membrane	0.48*	0.34*	0.40	0.36
Bulging of tympanic membrane	0.25	0.31	0.48†	0.17†
Mobility on insufflation	0.37*	0.22*	0.13	0.14
Asymmetry of tympanic membranes	0.17*	0.28*	0.17	0.16
Ear pain during examination	0.09	0.14	0.09†	0.28†
General appearance of the child	0.08	0.06	0.02	0.06
Did the child start to cry just before the examination?	0.02	-0.03	-0.01	-0.02
Other Factors				
Parents' personal position concerning antibiotics	-0.05	0.03	0.02	0.02
Ability of parents to provide effective care to a sick child	0.01	-0.04	-0.02	-0.01
Does caring for sick child greatly upset parents' ordinary schedule?	0	0.02	0	0.01
Are there babies or other small children in the family?	0	0.02	0	0.02

Note: Higher values indicate a greater weight given to this cue in making the diagnosis of acute otitis media. Participants whose judgments failed to pass the F-test for multiple regression models (1 French pediatrician and 5 French parents) were excluded from the analysis.

AOM denotes acute otitis media; URI, upper respiratory infection.

*Significant comparison for US group, $P < .05$.

†Significant comparison for French group, $P < .05$.

choice. Half the participants completed the diagnosis set first; half did the treatment set first. They completed the study at home. They were instructed to refrain from looking back at the first set after finishing and to take a short break of up to a day between the 2 sets. At the end of the study session, the participants answered certain questions about attitudes toward health care and risk and about their background that might account for differences in their responses to the scenarios.*

Data Analysis

Two multiple linear regression analyses were performed for each participant (physician or parent). In one regression, the predicted variable was the judgment of the probability of AOM; in the other, it was

*These questions are listed in an Appendix on the *JFP* Web site, www.jfponline.com.

the choice of treatment. Before performing the second regression, the treatment choice was combined with the degree of certainty about it to create a treatment score on a 10-point scale ranging from -5 for “observe/completely sure” to 5 for “treat/completely sure” (with no 0). This score was used in the multiple linear regression analysis as the dependent variable. A participant was included in these analyses only if his or her R^2 passed the F-test for fitness of the multiple regression model at P less than .05; failure of a model to pass the F-test meant that the individual’s judgments were not predictable by the cues. This could occur if he or she had answered randomly or had made mistakes.

Multivariate analysis of variance was used to test the differences in the mean responses to the questions on attitudes and opinions of each group of par-

TABLE 3

MEAN BETA WEIGHTS FOR CUES FOR CHOOSING TREATMENT OF ACUTE OTITIS MEDIA				
Cue	US Physicians (n=19)	US Parents (n=49)	French Physicians (n=50)	French Parents (n=75)
History				
Past history of AOM	0.02	0.04	0.04	0.08
URI symptoms	0.02	0.03	0.06	0.07
Ear pain noted by parent	0.11	0.10	0.07†	0.0†
Findings on examination				
Fever	0.21	0.28	0.25†	0.52†
Redness of Tympanic membrane	0.36	0.29	0.34†	0.23†
Bulging of tympanic membrane	0.19	0.23	0.41†	0.08†
Mobility on insufflation	0.28*	0.16*	0.12	0.10
Asymmetry of tympanic membranes	0.20	0.23	0.13	0.09
Ear pain during examination	0.04	0.11	0.04†	0.14†
General appearance of the child	0.16	0.10	0.10†	0.04†
Did the child start to cry just before the examination?	0.02	0	0.03	0
Other factors				
Parents' personal position concerning antibiotics	0.17*	0.06*	0.11†	0.03†
Ability of parents of provide effective care to a sick child	-0.05	-0.03	-0.05	-0.04
Does caring for sick child greatly upset parents' ordinary schedule?	0.01	0.04	0.01	-0.08
Are there babies or other small children in the family?	0.01	0.04	0.04	0.01

Note: Higher values indicate a greater weight given to this cue when deciding whether to treat with antibiotics. Participants whose judgments failed to pass the F-test for multiple regression models (3 French generalists, 3 French pediatricians, 3 US parents, and 11 French parents) were excluded from the analysis. AOM denotes acute otitis media; URI, upper respiratory infection.
 *Significant comparison for US group, $P < .05$.
 †Significant comparison for French group, $P < .05$.

ticipants. The association of individual attitudes and opinions about AOM and health care with treatment choices was explored by correlating the percentage of cases treated with antibiotics with the responses to each of the questions about attitudes and opinions.

RESULTS

The judgments of the parents were remarkably similar to those of the physicians, both in the United States and France. The means and the ranges of the mean probability judgments of the individual participants in all the groups were almost identical at 50% or just above (Table 1, row 1). The cue weights for diagnosis (Table 2) were also quite similar. The physical examination provided the key information for both the parents and physicians. The only differences were that French parents gave more weight

than the other groups to a past history of ear infections (beta weight = 0.15) and focused more on fever (0.30) and ear pain during the examination (0.28) than on bulging (0.17).

In choosing treatment, the parents in each country had lower mean treatment scores (Table 1, row 2) than the physicians, but these differences were not statistically significant. Likewise, the overall percentages of cases judged as needing antibiotics, though lower for parents, were not significantly different between the physicians and parents of each country: 53.0% for US physicians, 44.6% for US parents, 53.4% for French physicians, and 51.1% for French parents. Among the 4 groups the important cues for treatment (Table 3) were similar, stressing the physical examination findings and de-emphasizing the history, including the parents' report of ear

pain. French parents gave atypical stress to the child's temperature (beta weight = 0.52), so that they differed from other groups in their judgments of several individual scenarios. Both groups of parents assigned significantly less weight than the physicians of all groups to the cue of the parents' position on antibiotics. Indeed, when asked to put themselves in the place of a physician, the parents did not give importance to any of the parent-sensitive cues, even when the question was treatment. These cues included ear pain noted by the parent, the parents' personal position concerning antibiotics, whether caring for a sick child greatly upsets the parents' ordinary schedule, and whether there are babies or other small children in the family.

Attitudes and opinions related to AOM and health care were not associated with the percentage of cases in which the participant of any group chose to treat with antibiotics. Among both the Americans and the French, the parents thought physicians worried more about charges of malpractice when making decisions about patient care than physicians claimed they did ($P < .005$ for both countries). Parents were bothered when their child was sick more than physicians were bothered when "one of my patients" was sick ($P < .005$ for both). If there was a possibility that their child had "a serious illness that is rare but curable," parents were more willing than physicians to order diagnostic tests even when they would cost the parents "a great deal of time and/or money" ($P < .005$ for both). Interestingly, parents agreed less strongly than physicians with the statement "A doctor should pay close attention to the needs and preferences of a child's parents" ($P < .005$ for both). US parents, but not those in France, agreed more strongly than physicians that if their child might have a serious illness that was rare but curable diagnostic tests should be ordered even when they were "very expensive for the child's insurance plan" ($P < .005$). French parents, but not American ones, agreed more strongly than physicians that "all ear infections should be treated with antibiotics" ($P < .005$).

DISCUSSION

Although physicians are aware that antibiotic resistance of bacteria is an increasing problem,³⁹⁻⁴¹ they continue to prescribe antibiotics for patients who are unlikely to benefit from them.^{2,3,13,39,42,43} There are multiple plausible reasons for this.^{7,17,44-46} Some of these relate to physicians' perceptions of the wants and needs of their patients and their caretakers. Physicians may¹⁷ (or may not⁴⁶) make different deci-

sions for individuals they are dealing with than for community groups. They know the public misunderstands the indications for antibiotics,^{25,49,50} and they may perceive, often incorrectly,^{19,21} that patients or parents want antibiotics and will be dissatisfied if they do not receive them.^{22,23,26-29,45,51} They may practice defensive medicine²⁸ or believe that it takes less time and effort to prescribe antibiotics than to explain why they are withholding them.^{28,45} They may be sensitive to the socioeconomic pressures on patients and parents related to daycare policies, work schedules, and the costs of return visits.⁴⁶

Our study results should be reassuring to physicians. The most striking finding was the similarity between parents' diagnostic judgments and treatment choices and those of physicians. The only difference in judgment policies was that the French parents placed greater stress than the French physicians on fever and gave a lower weight to bulging when deciding about treatment, which may be understandable given their unfamiliarity with the technical aspects of examining an ear.³¹ Indeed, contrary to our expectations, parents in both countries gave less weight to parent-sensitive cues than did physicians. Overall, parents did not diagnose AOM in the scenario children or recommend treating them with antibiotics more frequently than physicians.

The parents' restraint concerning antibiotics is surprising given physicians' perceptions and the results of a recent US survey⁵² in which 96% of parents said that "ear infections can affect a baby's hearing," and only 11% thought that "most ear infections get better by themselves." Also, recent experts have stressed the high indirect costs of an episode of AOM and the value to parents of reducing the duration of the illness.⁵³⁻⁵⁶ One explanation may be the rising parental worry that antibiotic treatment may lessen their child's ability to fight off future infections, in particular because of the spread of antibiotic-resistant bacteria.²⁷ The parents in our study worried as much as the physicians about the adverse effects of antibiotics and agreed just as strongly as the physicians that the resistance of bacteria to antibiotics is the most important threat to the future health of the public. The parents' ability to adopt the physician's point of view should encourage physicians to undertake the patient and parent education efforts recently recommended^{125,28,57} as the best way to reduce the excessive prescription of antibiotics.

We had anticipated incorrectly that the decision to treat would be influenced by attitudes toward uncertainty, ambiguity, and risk.⁵⁹⁻⁶³ We had also expected, again incorrectly, that a greater belief in the usefulness

of antibiotics and (for the parents alone) in the contagious nature of ear infections — and a lesser worry about antibiotic side effects and bacterial resistance — would identify physicians and parents who opted more frequently for antibiotics. The explanation may be that our questions were insensitive or that general attitudes are poor predictors of individual case-by-case choices and behavior. It may also be that physicians—and even parents who take the role of physicians—believe that diagnosis is the first and determining step in managing a possible ear infection.

Limitations

Our study has several limitations. First, generalization is limited by the small samples, the inequality of the sample sizes, and the convenience nature of the samples. Second, the patients were hypothetical, presented on paper in schematic form, with neither the richness nor the vividness of the real children brought by parents to physicians' offices. Although the use of "paper patients" has been questioned,^{64,65} it is practical and has been supported in other studies of clinical decision making.^{66,69} Third, comparisons between the French and Americans may have been influenced by unappreciated differences in meaning of the French and English versions of the scenarios and questions.

CONCLUSIONS

It is encouraging that parents in our study were able to adopt the physician's perspective and to focus on medical indications rather than on parental needs in their treatment decisions, that they did not choose to prescribe antibiotics more frequently than the physicians, and that they were as concerned as the physicians about the adverse effects of antibiotics and the threat from resistant bacteria. Patients and parents may, therefore, be more willing to forgo antibiotics than physicians realize.

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